A Comparative Cost-Benefit Analysis of Moving Warmboard's New Manufacturing Plant from Watsonville CA. to one of Three Alternate Sites

A Senior Project

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by

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ABSTRACT

The task of this project was to perform a cost-benefit analysis of potential manufacturing sites for Warmboard's new plant. Any time a company decides to open a new factory, lots of research needs to be done before any action is taken. Since this is such a common occurrence in industry, many templates and criteria for evaluation have been used that vary greatly in content and quality. This senior project tries to create Warmboard specific criteria and a way to cross evaluate potential manufacturing sites that is more valuable and relevant to Warmboard's specific needs. To create this report, a specific list of variables is determined that can be cross evaluated. Those variables are then assigned values to determine their importance relative to Warmboard's specific wants and needs. A vast list of possible variables was narrowed down, leading to five main categories: business and operating conditions, geographically variable costs, real estate variables, laws and regulatory variables by county, and finally Warmboard specific variables. Each of these categories is broken down into smaller subsections, and is then broken down even further into the individual variables. Once each of these categories is filled out based on the best example location in each city, a satisfaction rating is assigned based on how well each of the variables is satisfied. To narrow down the multitude of potential sites in each area to just one site, a more specific table was used to compare three or four of the most satis*factory* sites. When investigating which site would be the most beneficial, all three ideal sites beat out the average sites in Watsonville as well as Watsonville's highest scoring site. The best site was found to be in South San Francisco, surpassing the average of the Watsonville sites a by 10% Warmboard value. The final recommendation is that Warmboard should seriously consider choosing either South San Francisco for its value, or Gilroy for its low cost. Both sites are more suitable options than any of the potential Watsonville sites.

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I would first like to thank Warmboard Incorporated for allowing me to work with them on this project. This is an ideal Industrial Technology senior project and I thank Warmboard for giving me the opportunity to do this analysis. This project has taught me more than I could have ever learned in a classroom and Warmboard was very helpful along the whole project.

I would also like to thank Tony Gasparich my industry advisor who gave me constant feedback and instruction along the entire process to ultimately come up with a better report that satisfied Warmboard's needs better.

Finally I would like to thank Professor Lou Tornatzky for guiding me along this project and for giving me instruction on how to produce a professional useful report.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

CHAPTER I

INTRODUCTION

This section will explain briefly the main points that will be discussed in the body of the report as well as the deliverables that are to be expected. It will start by outlining the problem statement explaining the basic purpose of the report. Secondly it will describe the needs that are required to be met as well as rank them for calculating the benefit of the "cost-benefit". It will then lead into a brief background of the related work that will be necessary beyond the research of cost-benefit analysis. Following this the report will cover some initial potential solutions to this projects need. It will then continue into the most important part of this section which is its contributory value to Warmboard Incorporated. The section will then conclude with the scope of the project to round out the introduction.

Problem Statement

The purpose of this report is to perform a comparative cost-benefit analysis of moving Warmboard's new manufacturing plant from Watsonville CA to one of three alternate sites in or near the Bay Area. This first requires a complete understanding of the proposed site of Watsonville California so that there is a baseline cost that can be compared to the other sites. Once this is known, three alternate sites have to be chosen that are both economically feasible as well as maintain intangible benefits. An example of one of these benefits is being in relative proximity to the main office in Aptos California. Once these sites are chosen, all relevant values of the different sites have to be compared in a standard form so that they can be evaluated across individual statistics as well as the total cost of implementation.

Aside from satisfying the graduation requirement of the senior project and furthering the research and knowledge of manufacturing site selection, the purpose of this report and

evaluation of different sites is to save Warmboard money. It will accomplish this by moving it to a more cost effective and more statistically beneficial site. If there is a cost savings to be had, this information will be given to Warmboard who will hopefully accept the recommendation and the savings can be passed on to achieve an earlier return on investment (R.O.I).

Needs

This section will tabulate the needs of Warmboard and rank their importance on a scale of 1 to 4. The first need of this project is to provide an in depth analysis of the already chosen site for a comparative base line. This ranks a 4 on the scale of importance because while it is necessary it is only one small part of the overall report. The second need of this project is to designate three feasible and desirable locations to compare the base site to. Similar to the first need, this ranks a 3 on importance because while it is very necessary to this project, this is again only a small part of the deliverable. The next need is a standard format for comparing individual statistical information on the different sites compared to the base site of Watsonville. This ranks a 2 on the scale of importance because it will ultimately be what the executives of Warmboard use to compare the sites other that the overall cost of implementation. One of the most important needs of this project is to provide a written report of cost-benefit analysis explaining in detail all that went into the final recommendation. This obviously ranks a 1 on importance because it is the main deliverable aside from the actual recommendation. Another important need of this project is to provide a final recommendation of the plants location as well as a justified call to action based on economic benefits as well intangible benefits. This too ranks a 1 because it is the conclusion and answer for this project.

Background or Related Work

This is a topic that touches on many fields such as: manufacturing, real estate, and laws and regulations of specific counties. This being the case, there are numerous sources that touch on each of these components. The difficulty wasn't in finding information on the related fields. It was in finding sources that more closely related to Warmboard's specific needs for this project. The first of these sources is Yoonsoo Lee (2008) who did

an analysis of geographic redistribution of US manufacturing and the role of state development policy. This was a study to determine if governmental incentives actually draw manufacturing to these counties with tax incentives and easy regulations. For the manufacturing part of the report a source by Vondembrose and Tracey (2008) goes into the importance of vendors when choosing a manufacturing site. Finally for the real estate source Lindquist and Schneider (2008) explain how to come up with a list of variables to judge each real estate site by. All these sources expanded into more sources once further research was done.

Potential Solutions

Since this project is proposing three alternate sites with better than average chances of price reduction, there is a good chance that one of them will be lower than the base price of the Watsonville locations. If that is the case, there are still intangible benefits such as commute time to and from headquarters, ease of regulations in the locations, as well as many more benefits that need to be considered as well. If one of these sites meets the cost requirement as well as the intangible benefits then a recommendation will be given to move the plant to the new location.

To solve the first need of establishing a comparable base line of the Watsonville location, this report will use what Warmboard has already calculated. Warmboard had to calculate the cost of an average base site in order to apply for their loan and to present to investors. This is information was compiled by both the accountant of Warmboard as well as the plant engineer that is currently going to set up the new plant. The second need of picking the 3 alternate locations will be facilitated by the literature review, as it will help narrow the cities to ones that are more feasible in both regulations and cost. To satisfy the need of determining a standard of comparing sites including both cost and benefits, Tony Gasparich the technical advisor to this project, determines the Warmboard specific ranking. After this is done it will satisfy the need of compiling all of the necessary information into one concise report to select the best site. The site selection and call to action will both be completed once the actual comparison of the locations is done.

Contribution

If successful, this project will save Warmboard money when opening their new manufacturing plant as well as in the future. If there are labor costs reductions, and other cost savings such as permit/regulatory fees that are better in one county vs. the next, then they can be added to the total cost savings. This money can then be put directly back into the installation of the new plant, which will quickly make the factory more profitable and achieve an R.O.I. even sooner.

Scope of Project

The general scope of this project will entail a few elements. The first element will require researching credible sources on everything that has to do with a new site startup. This includes but is not limited to: the laws and regulations of the locations counties, the real estate value of the locations, the labor costs and size, as well as the installation cost of a new plant. Taking all of this into consideration, the next part of the project requires picking 3 feasible alternate locations somewhere in close proximity to headquarters. Once these are established, as stated before, Warmboard will be contacted on their specific criteria for comparing the sites to each other. All the information from Warmboard will then be compiled into a checklist or a table of variables that need to be evaluated to a final comparable number. It will then be used to rank the sites and determine the one with the greatest value. The main headings of these variables are: business and operating conditions, geographically variable costs, real estate variables, and laws and regulations of the specific counties. In addition to this, a few values that take into consideration this specific case such as an equation for determining the effect of the distance from the manufacturing plant to the headquarters located in Aptos California will be specifically created for this Warmboard case. This is a fairly large concern for the project because one of the main criteria is that the CEO as well as other managers will want to have the option of visiting the factory within a day. Under each category different aspects will be evaluated. In the case of the business and operating conditions, sub categories would include access to customers and suppliers, workforce availability, utility infrastructure, transportation infrastructure, regulatory environment, business

services and amenities. Once all of these values are established, all of this information will be compiled into one clear report that recommends a site and calls Warmboard to action.

CHAPTER II

LITERATURE SEARCH

The purpose of this project is to find an alternate site to the Watsonville site somewhere near Aptos California with an overall cost-benefit for Warmboard. It is important to do a literature review before picking sites not only because it will help in picking more profitable feasible locations, but also because it is a waste of time to repeat work that has already been done by someone else before you. As the saying goes "we stand on the shoulders of giants", that is still true to this day and is very applicable to this situation since this is a problem that has been around for a while and has many previous applications. This section will cover the history of the project subject as well as what has been written on it before, while determining the strengths and weaknesses of these sources.

Brief History of Site Selection Analysis

Companies have been determining the most profitable location for their factories ever since the first factory was conceived. This topic however, deals more with modern day selection analysis and all the myriad of costs other than the base cost of the implementation of a factory. A cost-benefit analysis of opening a factory is a topic that touches on a variety of fields such as business and operating conditions, geographically variable costs, real estate variables, and laws and regulations of the specific counties. There are numerous sources that touch on each of the components but the difficulty was finding sources that are more closely related to opening a light manufacturing plant in a similar city to the ones being evaluated. There really wasn't anything specifically related to site selection with regards to light manufacturing. The closest sources were ones that related to manufacturing in general, such as food manufacturing or other general types of manufacturing.

Initial Foundation of Location Analysis

When the search was initially started on determining the location analysis the first article that came up was written by Deloitte Consulting GEO Group on this very topic (Lindquist & Schneider, 2008). They claimed that in order to determine an accurate checklist to compare across various sites you first needed to understand the projects parameters. In one example the projects parameters including the timeline, the scope of

the project, the people involved and the general plan of implementation are going to be the same across all three variable sites and the main base site of Watsonville. This was determined and set by Warmboard for the base site and will only be mentioned if for some reason a specific location makes it so that the plan has to be modified for that particular site.

Governmental Financial Incentives and its Effect on Plant Relocations

The first reference that was fairly related to this project was Yoonsoo Lee (2008) who analyzed the geographic redistribution of US manufacturing and the role of state development policy. This closely relates to this topic because he analyses whether or not governmental incentives affect industry enough to cause a change of location based on a cost savings from these incentives. His overall conclusion was that tax and financial incentives created by the government to stimulate a change in location do not have a strong correlation to where companies ultimately choose to open their factories. This is very interesting because it makes the point that a small tax write off or financial incentive is a small factor in determining what will actually make a plant profitable. There are so many other factors such as the cost of labor, the cost of goods sold, real estate value, as well as many more that have a much greater affect on profitability. This doesn't mean that these governmental factors shouldn't be taken into consideration, only that through his research there is no correlation between government incentives and companies site selection. This was a particularly good source because it covered a big section of this project that is governmental regulations. This was very thoroughly researched, documented, and cited with lots of statistical analysis to back up his findings. This source was also unbiased throughout the whole journal only making one recommendation of what he thought this information showed statistically at the end based on the statistics of standard deviation.

Site Selection Checklist of Variables to be Considered

To determine which variables should be considered to evaluate these various sites, there were a few sources that helped narrow down the most important values into a finalized list that determined the best site for the new plant. The two sources that helped the most

was the article by Brad Lindquist and Phil Schneider (2008) about site selection checklists, and the Journal of Urban Economics where they discuss firm relocation and site selection in suburban municipalities (Lindquist & Schneider, 2008).

In the first source they explain that site selection checklists vary greatly depending on the industry, function, and company. While you can try to create a master list of every possible variable, the best method to determine a location checklist is to start off with the main concerns and modify it based on your situation. They claim that the four main criteria are business and operating conditions, geographically variable costs, real estate variables, laws and regulations of the specific counties, as well as risks. Under these four main criteria there are sub sections that you modify based on your specific situation. For instance, under business and operation conditions there is a sub category of workforce. Under workforce you have to consider availability, capability, scalability, sustainability, and livability. To apply this to the current problem since there is a set cost of labor and a known number of employees, determined by Warmboard, the only factors needed to take into consideration are availability and sustainability. If there are enough employees in the given area, and you have the ability to hire more if the business grows, then all of the other factors should be satisfactory. It is also important to note that each variable will have a multiplicative factor to determine which criteria are more important to the overall decision based on Tony's and Warmboard's specific needs.

This source was possibly one of the most helpful sources on this topic since it simply gave a comprehensive list of variables that could then be modified to fit this specific case. Unfortunately this is not as credible of a source as some others as it is not peer reviewed but only an article written by a credible source from a top consulting firm. That being said, since this was not as technical as some of the other sources, and merely explained how to tailor a list to your criteria, it isn't entirely necessary that it was peer reviewed. The article simply gave advice on creating your own list.

The second source that was extremely helpful in explaining what is most important in choosing a manufacturing plant was Erickson and Wasylenko (1980) where they claim that diverse economies and an available labor force are some of the most important factors in site selection. They claim it is important to be among suburban locations for firms in all industries not just manufacturing. They also go on to say that fiscal variables

are of secondary significance in the selection of a plant location. This greatly helped to prioritize the list of variables to determine where to place the plant.

This is a very credible source since it was published in a peer-reviewed journal and both of the authors are from Pennsylvania State University department of economics. This usually means that it went through a preliminary proofing by the university before it was submitted to be peer reviewed.

By combining both of these sources as well as bits from other a list of comparable variables as well as being able to rank the variables according to importance was able to be modified for Warmboard's specific case.

Alternate Site's Governmental Regulations

For all three of the various alternate sites different governmental regulations such as use permits, zoning, and tenant improvements were established through each of the counties government websites. For all three alternate sites there were only two counties, San Mateo County, and Santa Clara County. That being the case for the San Jose site and the Gilroy site governmental regulations should be fairly similar except for the city specific laws and regulations. The next step is to compare both of these counties to Santa Cruz County's regulations and determine which of these has the least impact on opening a new light manufacturing plant and making tenant improvements.

Since all of this information was directly from the government website this is as credible as a source there can be (County of Santa Clara, 2010). They are the governing body that ultimately makes the regulatory decisions. All of the permit and zoning information is as accurate and current as you can get from a government source.

Literature Search Conclusion

Where this project differs from these other resources is that, while they are along the same general line as this project, they do not evaluate multiple sites to a single base site comparison to see if there is a cost savings with regards to a light manufacturing plant. This particular analysis is quite specific and may have never been documented or published in the history of cost-benefit analyses. This project will add to this field as another case study that can be referenced in the future to determine similar factory setups

for light manufacturing plants. While this project will be somewhat focused on Warmboard specific items it will mostly be determining the values for a light manufacturing plant.

CHAPTER III

SOLUTION

The purpose of this project is to find one of three alternate sites, other than the main Watsonville base site, somewhere near the Bay Area that has a cost savings for Warmboard. The intended purpose is a higher standard of living for the employees and a cost savings that will help Warmboard achieve an ROI sooner. This section will explain

why these three alternate sites were chosen and explain how a checklist of variables for the cost-benefit evaluation was determined. This section will also explain the procedure for how each value was determined by explaining the underlying equation for determining the final number. It will provide hard numbers and tables that clearly show how the final recommendation was chosen.

There are a few variables that were considered but were not mentioned because they are equivalent across all of the different sites. There are: national, state, and local regulations but only the local regulations are evaluated in this report. The reason that only the local regulations are taken into account is because all three sites are in the same country and in the same state. An example of one of these regulations is California Division of Occupational Safety and Health (Cal/OSHA) regulations of safety. This is obviously a concern that needs to be taken into consideration, but since all of the sites are located in California these regulations will be the same across all sites. Similarly unless a specific location causes the leasehold improvements to be cheaper or more expensive it is assumed that it will be the same cost across all sites and not taken into the final evaluation.

Base Site: Watsonville, Ca.

This is the main city that Warmboard is currently looking at to move their manufacturing plant to. There are multiple reasons why Warmboard chose this as their initial city but the primary concern for choosing this city was that it is only twenty minutes away from the headquarters making it easy for a quick trip to the manufacturing plant to oversee any problems or to simply check on the efficiency of the plant. The base line statistics of the labor cost, insurance, lease cost, and tenant improvements were all determined using average numbers of Watsonville and will be the majority of the comparison to the other sites.

Alternate Site 1: South San Francisco, Ca.

The South San Francisco site was chosen for a few reasons. The first reason South San Francisco was chosen was that it is the closest site to the Bay Area which is one of the main criteria of this project. The second factor was the fact that it has a viable workforce

in the surrounding area already proven by its manufacturing. The third reason that it was chosen as an ideal location, is that it has plenty of industrial zoning creating many potential sites for a plant. When the initial search was conducted to find various sites that would be useable, South San Francisco had the most hits for available locations. Despite having the largest supply of sites, all three places in this area had the highest average rent due mostly to its proximity to the Bay Area. Even considering the high rent, South San Francisco is still one of the more viable options since there is a little flexibility in the amount Warmboard is willing to pay. South San Francisco has the best benefits, so if a site meets the criteria for cost then it is obvious that this should be the manufacturing site due to the greater value.

Alternate Site 2: Gilroy, Ca.

The Gilroy site was chosen along the same reasons of San Jose, for its proximity to the Warmboard headquarters, its depth of labor force, as well as its friendliness for business expansion. One of the main criteria for the factory is that it is 25,000 to 30,000 square feet and is zoned for light manufacturing. Light manufacturing is simply manufacturing that isn't going to produce tons of noise, debris, or be using hazardous materials. In this case a constant mild amount of noise as well as dust will be emitted during operating hours. This means that it has to be deemed light manufacturing or higher for it even to be considered a site. Gilroy is very similar to Watsonville in its low cost labor force accompanied by its low cost real estate. The rent in Gilroy is very similar to Watsonville which also makes Gilroy a very likely site.

Alternate Site 3: San Jose, Ca.

The San Jose site was chosen because it is still within commuting distance to the Bay Area but is also still very close to the headquarters in Aptos. Similar to the previous sites however, it does have enough zoning in commercial manufacturing as well as industrial zoning that allows for many potential warehouses for lease. San Jose is the third largest city in California and is close to San Francisco. A diverse economy, as well as a huge labor pool, both contributes to this site being particularly appealing. The final factor, as

was mentioned before, is that this is the closest to the headquarters of any of the alternate sites and takes only 45 minutes to commute to. All of these reasons factor in to make a potential cost savings for moving the factory to San Jose.

The Checklist of Comparative Values Used to Determine the Best Site

As was mentioned before, a standardized method of comparing the various sites was needed to cross evaluate the different sites, based on costs and benefits to Warmboard. To come up with this list of variables, a combination of other various site selection criteria was used to create a list specific to Warmboard. By narrowing down the vast list of possible variables it led to five main categories: business and operating conditions, geographically variable costs, real estate variables, laws and regulatory variables by county, and finally Warmboard specific variables. Each of these categories is then broken down into smaller subsections, which is then broken down even further to the individual variables. Once each of these categories is filled out based on the best example location in each city, then a satisfaction rating is assigned based on how well each of the variables is satisfied. After these values are determined they are then multiplied by the individual Warmboard values that weight each variable based on how important satisfying this need is to Warmboard. The list of Warmboard's value multiplier was created by contacting Warmboard and assigning each variable a rating of 1-5 based on its relevance to this project. Each of the variables is then calculated so that it has a Warmboard specific value. After that, each category is totaled by sub category and overall to cross evaluate the three alternate sites to see how it compares to the base site.

Business and Operating Conditions

Business and operating conditions has four sub-categories that were considered relevant to Warmboard's specific needs. The four sub-categories are access, workforce, utility infrastructure, and transportation infrastructure. The relevant business and operating conditions with regards to access are access to suppliers and access to shipping. For these two variables they will be rated high, medium, or low receiving and a satisfaction rating of 5, 3, or 1 respectively. The next sub-category has five variables pertaining to

workforce: availability, capability, scalability, sustainability, and livability. Workforce availability, capability, and scalability ranked fairly average on importance to Warmboard because in today's economy these needs are going to be met in almost any county. When there is a large labor pool workforce issues such as these are generally not an issue. Workforce sustainability is determined by how easy it is to keep your workforce as well as ease in replacing employees. This ranks fairly high on importance to Warmboard because it costs money to replace workers and train new ones. It costs even more to lose and employee and not be able to replace them causing a halt in production. In this current market there is no real issue with this because jobs are so scarce that all four sites should rank fairly similar. If each of the sites rank exactly same in any variable then it negates that variables relevance in cross-evaluation. The reason this variable is still considered is because it is important to know how much relevance Warmboard places on its workforce sustainability and there will be some variance from San Francisco to Watsonville. The final workforce variable is livability, which was the initial spark for this whole project. Warmboard considers this fairly important but is not a "make or break" item. Since there is such a high demand for jobs livability will be sacrificed by enough people that there will be a sustainable workforce.

The next two categories can be grouped together because the utility infrastructure and the transportation infrastructure are both dependant on the specific site selection and not the general county selection. Utilities are broken up into: power, fuel, water/sewer, and telecom. Utility cost will vary even within the same city depending on which service provider is available to you. This can change from one side of the railroad track to the other and can change the cost of your overall operation significantly over the long term. Generally Pacific Gas & Electric (PG&E) will maintain the same cost for power throughout the state if the building is classified the same with regards to their payment plan. Warmboard's site will fall under the industrial power category and should be the same across all three sites. The transportation infrastructure should generally be the same across the country unless specific lots have value added benefits specific to that site. While there may be a train station locally that you can ship out of, an even better situation would be to have train tracks run directly through the property. The purpose of these

different values is to capture all of the transportation variables mostly concerning shipping and not just commuting.

Geographically Variable Costs

The three sub-categories that make up this particular section are: workforce, real estate, and logistics. Within the subcategory of workforce, wages or salaries have to be the most important as they vary greatly location to location. While it is true that benefits generally will stay the same if it is the same company and the same state as the other unknowns. The real estate sub section is geographically dependant because, the size of the lot, how much of it is taken by office space, and the option to buy it after the lease is up, is entirely dependent on the particular site chosen. All of these variables have fairly high value to Warmboard so they have a strong pull for choosing the site.

Real Estate Variables

The variables under real estate of cost per square foot, expandability, access, lease terms, and timing are all fairly self-explanatory as to how it is evaluated and ranked. Even though these variables are fairly straightforward they have the second largest emphasis on them as they account for the majority of the cost. The next determinant would be to choose which is more important, cost or benefits. In this next section the variables are determined almost entirely by benefits.

Laws and Regulatory Variables by County

As was determined by the literature review, laws and regulatory incentives or deterrents are not big driving factors in site selection. If the building is not zoned for noise or dust than it makes it an unusable site because it is far too costly and time consuming to try and change the zoning for a site.

Warmboard Specific Variables

Counter to the real estate variables, which are the majority of costs, are the Warmboard specific variables, which is the majority of the benefits. The list of Warmboard Specific Variables was created specifically for this site and the plants particular needs. The

loading dock, the building being younger than twenty years old, and the 1200 Amp power supply are all extra benefits that are not deal breakers but major incentives for choosing sites with these features. However, if the distance to headquarters is too great, the ceiling height is under 18' or if the building does not meet the minimum power supply of 600 Amp's 440 Volt's, then it is a deal breaker and the site cannot be considered for manufacturing Warmboard. These criteria are the bare minimum for considering a site and the rest of the Warmboard specific variables are just lesser incentives.

Collecting Data

Collecting the hard data for the excel tables was done across many sources over many types of media. The hard numbers of the individual properties were found using various real estate sites such as Showcase.com (CoStar Realty Information, 2010), Rofo.com (Rofo, 2010), and Loopnet.com (LoopNet Inc., 2010). This included: the number of loading docks, square footage, price per foot to lease, ceiling height, and any other Warmboard specific criteria that had to do with the specific site. For the laws and regulatory variables as well as the geographically variable costs the information was collected from the respective counties website as well as a few other governmental websites. A very helpful one was a website that linked to all the various economic zones and the different governmental incentives by area. Both South San Francisco and San Jose have economic zones where there are large tax write offs and governmental incentives if you are a new company or are creating jobs. Warmboard should definitely look into some of these programs because while they aren't big enough to cause a move from one site to another, if it is a close comparison between two sites then it could be the deciding factor.

Data Analysis Used

For this project a modified cost-benefit analysis was used to determine which of the four sites had the greatest overall value. The reason this method was chosen was for two reasons. The first reason was that this is a proven method in industry for cross-evaluating manufacturing sites as well as any expansion of a company. The second reason that a combination of cost and benefits is used is that if you evaluated these sites based on costs

or benefits alone, you sacrifice one for the other. If low cost is your greatest concern than you will have to sacrifice some benefits. A triple net lease would be cheaper per foot per month, but would not have the benefits of a full service lease, where the taxes, insurance, common area maintenance, utilities, and janitorial services are all handled by the landlord. Similarly, if the added benefits are your greatest concern then you will be paying more for these extra benefits and sacrificing the cost of the lease for the benefits. This is why a combination of both was used to determine the best possible site overall.

Tools Used to Cross-Evaluate the Three Alternate Sites

The two tools used to cross-evaluate the manufacturing sites were a cost-benefit analysis modified to Warmboard's specific needs, and Excel where these tables were entered and calculated. Two different tables are needed to fully evaluate which site should be compared for each city and what the overall ranking was for that site versus the other sites. The initial site selection tables: I, II, and III evaluated three or four of the top sites in both lease and purchase to determine the best site to compare against the Watsonville site. On the main cost-benefit excel tables: IV, V, VI, and VII both the variable satisfaction ratings as well as the Warmboard satisfaction ratings were calculated. The reason for this is to determine what the general satisfaction of each criteria would be if this was not a Warmboard project, and then to compare it to the relative Warmboard value to show that this project was in-fact necessary and solved a problem that a generic template or program could not.

CHAPTER IV

RESULTS

The purpose of this project is to find an alternate site to the base site of Watsonville California in one of three alternate sites closer to the Bay Area. The three alternate locations besides the base site are South San Francisco, Gilroy, and San Jose. These locations will be cross-evaluated based on a cost-benefit analysis that is specifically modified for Warmboard and this project. The purpose of this section is to use the methodology established in the previous section to determine how well each alternative satisfies the need of the project. Once comparable values are established for each site, a cost-benefit evaluation is used to determine which of the alternatives satisfies this projects needs the best. Once a site is chosen, the next step is to verify the accuracy of the selection by having the solution evaluated by faculty, industry experts, and potential users. Finally, the needs of the project will be compared to the overall satisfaction of that particular site to see how well it fits Warmboard's need.

The Advantages and Disadvantages of the Alternate Sites

To determine the advantages and disadvantages of the alternate sites a method of determining a likely site in each area first had to be established so that a single viable site

could be compared county to county. To do this, only site-specific variables were chosen, such as how many loading docks a site had as well as the power rating that the building currently uses. From tables: I, II, and III we can see four sites were used for the comparison of South San Francisco and San Jose, while three were considered for the evaluation of Gilroy. The highest Warmboard satisfaction rated site for each county was then used in the overall comparison to determine the best site for the new plant. The three top locations were: 239 Utah Av. for South San Francisco, 8100 Camino Arroyo Rd. for Gilroy, and 2277 Ringwood Av. for San Jose.

Choosing Alternate Site 1: 239 Utah Av. South San Francisco, Ca.

In table I four sites for lease were compared against each other to determine which site would represent South San Francisco in the main cost-benefit analysis. 239 Utah Av., 405 Victory Av., 1950 Cesar Chavez, and 230 Shaw Rd. were all evaluated in the same general manner as the main analysis with a satisfaction rating being multiplied by a Warmboard emphasis rating to determine the best site to satisfy Warmboard. Utah Av was the clear winner since the only criteria that brought its score down was the cost of the lease, which is about ten cents a square foot too high. This may be allowable since it is an industrial growth lease; in an industrial growth lease the landlord covers all the costs of taxes, insurance, and common area maintenance and the tenant only has to worry about utilities and janitorial services. Since this is the case, the cost of the lease will always be connected to what type of lease it actually is.

Choosing Alternate Site 2: 8100 Camino Arroyo Rd. Gilroy, Ca.

As can be seen in table II only three sites were evaluated in Gilroy because at the time of research the Gilroy market of industrial sites was sparse. Taking this into consideration, it is improbable that out of all the sites, Gilroy had the highest rated site at 161 Warmboard satisfaction points. Statistically this is an outlier or an uncommon property, but regardless Gilroy still has the best site without the other thirty variables being considered.

Choosing Alternate Site 3: 2277 Ringwood Av. San Jose, Ca.

Table III compared two sites for lease and two sites for sale in San Jose. This was done simply to give a broader understanding of the market and potential options. Even though Atteberry lane received a higher Warmboard satisfaction rating Ringwood Av. was used as the main site since Warmboard is currently looking for a lease and to purchase later down the road. The other two options are there simply as additional information should Warmboard want to purchase in San Jose later.

The Most Cost-Effective and Beneficial Site

Out of all three alternate sites, aside from the main site of Watsonville, South San Francisco's site came out the leader with an overall value of five hundred and fifty seven point five points. This is compared to an average Watsonville site that scored five hundred and three point five. Comparing the two sites there was a ten percent gain in Warmboard value for moving the site from Watsonville to South San Francisco, assuming they properly ranked the value of each factor. It seems rather unlikely that South San Francisco have the best cost-benefit site since this plant is the most expensive to lease out of the three chosen sites. If cost is a higher priority objective then Gilroy's site should be the recommended as it is cheaper than the South San Francisco site. If Warmboard's specific ratings are still correct, South San Francisco is the best option according to these criteria.

Verification of Solution

This solution will be easily verified since Warmboard will justify all the variables. All that will be left is simple multiplication and addition to determine the best solution. The only part of the formula that may be modified is the specific value multipliers that Warmboard chose. This would only be necessary if Warmboard wanted to try out placing more emphasis on either the cost or the benefits. Another reason to change the value multiplier would be to get a more accurate portrayal of Warmboard's wants if for some reason a particular value is not accurate in regard to what is needed.

Needs vs. Features of Final Solution

The final solution's satisfaction rating is built into the cost-benefit analysis, so the solution is directly related to the features satisfying the need. A satisfaction scale of 1-5 was used to determine the greatest need for every variable, even down to the smallest factor. The Warmboard specific satisfaction scale was calculated along with the general satisfaction scale to evaluate not only how well the site satisfied a manufacturing plants needs, but also to determine how well the features satisfied the needs of Warmboard and this project.

The South San Francisco site met almost all of the benefits perfectly and only had the main weakness of the cost per square foot. The distance to the headquarters was scored low because it is the farthest of the three sites and takes an hour and twenty minutes to drive from the headquarters to the plant. This is still very doable since a round trip in a day is feasible. With respect to the other Warmboard specific variables, South San Francisco meets all of them, but only the minimum requirement for power. The site does not have a preferred connection of 1200 Amp 440 Volt 3 phase electrical supply. Overall the site fulfills every necessary issue and only scored low on 6 criteria making it the best choice for this project.

CHAPTER V

CONCLUDING REMARKS

Given a base site of Watsonville, California, three alternate sites were chosen to cross evaluate the most valuable site using a cost-benefit analysis. To determine the best site for a given area, a small list of variables were given satisfaction criteria and the most suitable site per county was chosen. With the base line of the Watsonville site and the three best locations selected, a complete list of cost and benefit variables was determined to evaluate all sites. Besides the general satisfaction of criteria, a Warmboard emphasis number was multiplied to find the most accurate Warmboard value to cross evaluate and determine the best site.

Conclusions Drawn

One of the most important lessons drawn from this project is that a governmental incentive, whether it is for or against development, does not cause an industry shift; the incentives or negatives are far outweighed by the other costs of the business. Another lesson learned from this project is that it is not solely costs or benefits that determine the best site for a plan, but the combination of both to create the greatest value across all the variables. It is only the value you place on each that determines the actual value of the site.

Problems Encountered

A few factors limited this project from being as accurate as possible. One thing that should be done differently should a more accurate result be desired is that the more sites should be examined to find the most beneficial site. A further step beyond evaluating more sites would be to create an average value for each variable that is averaged from every factory site available in that county. The averages then would be calculated the same way using the same satisfaction rating multiplied by the Warmboard emphasis to determine the Warmboard satisfaction. This would be a better way to determine the best site since statistically it is swayed less by outliers, but this require far more intensive study.

Future of This Project

The opening of this plant has been pushed back due to lack of funds, which can be an issue because the forecast of the counties will be less accurate for planning a future opening. However, if future evaluation is needed because of outdated information, all the tables are dynamic, allowing the same template to be used to determine future markets by simply replacing the values with current information. Beyond that, once the recommendation is made, Warmboard can either choose to adhere to the recommendation or directly lose value in their new manufacturing plant by continuing to build in Watsonville.

Implementation of This Project

It cannot be determined whether or not this project will be implemented until it gets closer to the recommendation. One unknown factor is whether or not Warmboard will have the funds by the time the recommendation is given. The only action that can be taken to push this project into implementation is recommending the findings in the most professional way possible and working with Warmboard and Tony Gasparich to satisfy any adjustments that need to be made for the future.

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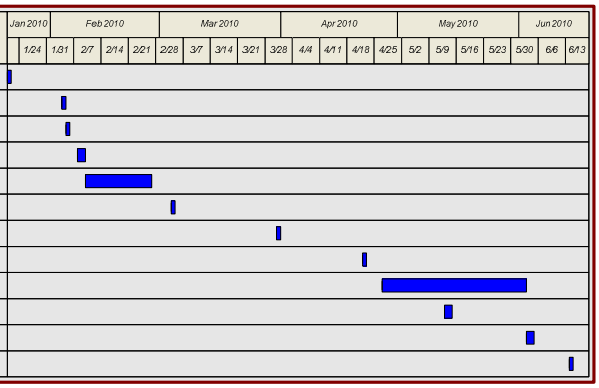
APPENDICIES

A.

ID	Task Name	Start	Finish	Duration
1	Project Proposal	1/21/2010	1/21/2010	1d
2	Progress Report 1	2/4/2010	2/4/2010	1d
3	Establish Watsonville Baseline	2/5/2010	2/5/2010	1d
4	Pick 3 Alternate Sites in Bay Area	2/8/2010	2/9/2010	2d
5	Collect Data on Alternate Sites	2/10/2010	2/26/2010	13d
6	Progress Report 2	3/4/2010	3/4/2010	1d
7	Oral Progress Report	3/31/2010	3/31/2010	1d
8	Progress Report 3	4/22/2010	4/22/2010	1d
9	Compile Information Into Final Report	4/27/2010	6/2/2010	27d
10	Final Draft Report	5/13/2010	5/14/2010	2d
11	Final Report	6/3/2010	6/4/2010	2d
12	Submit Recommendation to Warmboard	6/14/2010	6/14/2010	1d



B.

I. Potential South San Francisco Sites	Option to Buy	Cost of (25,000 -30,000sq.ft.) Site	Noise Ok	Dust Ok	≥18' Ceiling	Loading Dock	<20 yrs. Old	Min. 600Amp	Pref. 1200 Amp	Satisfaction Total
For Lease										
239 Utah Av.	Yes	$0.78 /SF/Month (25,262 sq.ft.) IG	Yes	Yes	23'	2	Yes	900A 320 V	No	
Satisfaction of Criteria (1-5)	5	2	5	5	5	5	5	4	1	**37**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	15	8	20	20	25	10	20	20	4	**142**
405 Victory Av.	No	$0.65 /SF/Month (27,934 sq.ft.) NNN	Yes	Yes	20'	9	1958	Yes	No	
Satisfaction of Criteria (1-5)	1	4	5	5	5	5	1	5	1	**32**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	16	20	20	25	10	4	25	4	**127**
1950 Cesar Chavez	No	$0.65 /SF (28,000 sq.ft.) IG	Yes	Yes	18'	0	No	Yes	No	
Satisfaction of Criteria (1-5)	1	4	5	5	4	1	2	5	1	**28**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	16	20	20	20	2	8	25	4	**118**
230 Shaw Rd.	No	$0.80 /SF (29,012 sq.ft.) IG	Yes	Yes	20'	6	Yes	Yes	No	
Satisfaction of Criteria (1-5)	1	1	5	5	5	5	5	5	1	**33**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	4	20	20	25	10	20	25	4	**131**

II.Potential Gilroy Sites	Option to Buy	Cost of (25,000 -30,000sq.ft.) Site	Noise Ok	Dust Ok	≥18' Celing	Loading Dock	<20 yrs. Old	Min. 600Amp	Pref. 1200 Amp	Satisfaction Total
For Lease										
6850 Alexander St.	No	$0.27 /SF/Month (26,880 sq.ft.) Full Service	Yes	Yes	24'	1	1983	Yes	No	
Satisfaction of Criteria (1-5)	1	5	5	5	5	4	1	5	1	**32**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	20	20	20	25	8	4	25	4	**129**
530 Rossi Ct.	No	$0.95 /SF/Month (26,071 sq.ft.) Full Service	Yes	Yes	20'	0	2007	Yes	yes	
Satisfaction of Criteria (1-5)	1	2	5	5	5	1	5	5	5	**34**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	8	20	20	25	2	20	25	20	**143**
8100 Camino Arroyo Rd.	Yes	$0.55 /SF/Month (25,000 sq.ft.) NNN	Yes	Yes	18'	2	1985	Yes	Yes	
Satisfaction of Criteria (1-5)	5	4	5	5	5	4	3	5	5	**41**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	15	16	20	20	25	8	12	25	20	**161**

III. Potential San Jose Sites	Option to Buy	Cost of (25,000 -30,000sq.ft.) Site	Noise Ok	Dust Ok	≥18' Celing	Loading Dock	<20 yrs. Old	Min. 600Amp	Pref. 1200 Amp	Satisfaction Total
For Lease										
1325 E. Julian St.	No	$0.60 /SF/Month (56,867 sq.ft.) Mod. Gross	Yes	Yes	24'	0	No	Yes	Yes	
Satisfaction of Criteria (1-5)	1	3	5	5	5	1	1	5	5	**31**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	12	20	20	25	2	4	25	20	**131**
2277 Ringwood Av.	No	$0.39 /SF/Month (29,159 sq.ft.) NNN	Yes	Yes	22'	4	Yes	Yes	No	
Satisfaction of Criteria (1-5)	1	5	5	5	5	5	5	5	1	**37**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	3	20	20	20	25	10	20	25	4	**147**
For Sale										
70-80 N. 27th St.	Yes	$132.14 /SF (27,244 sq.ft.)	Yes	Yes	17'	0	1999	Yes	Yes	
Satisfaction of Criteria (1-5)	5	4	5	5	3	1	5	5	5	**38**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	15	16	20	20	15	2	20	25	20	**153**
1480 Atteberry Lane	Yes	$89.27 /SF (31,085 sq.ft.)	Yes	Yes	22'	2	1983	Yes	Yes	
Satisfaction of Criteria (1-5)	5	5	5	5	5	4	1	5	5	**40**
Warmboard Emphasis	3	4	4	4	5	2	4	5	4	
Adjusted Warmboard Satisfaction	15	20	20	20	25	8	4	25	20	**157**

C.

IV. Watsonville - Average Watsonville Site	Actual	Satisfaction Score (1-5)	Value Multiplier	Warmboard Value
Business and Operating Conditions				
Access				
Suppliers	High	5	5	25
Shipping	High	5	5	25
Workforce				
Availability	High	5	3	15
Capability	Medium	3	3	9
Scalability	High	5	2	10
Sustainability	High	5	4	20
Livability	Low	1	4	4
Utility Infrastructure				
Power	Medium	3	5	15
Fuel	Medium	3	2	6
Water/Sewer	Medium	3	2	6
Telecom	Medium	3	2	6
Transportation Infrastructure				
Roads	High	5	5	25
Air	Med	3	2	6
Rail	Med	3	3	9
Port	Low	1	1	1
Geographically Variable Costs				
Workforce				
Wages/Salaries	Low	5	3	15
Benefits	Low	5	1	5
Real Estate				
Land/Sites of Proper Size (25,000-30,000 sq.ft.)	25,000 sq. ft.	5	5	25
Building is Mostly Warehouse With <3000 sq.ft. Office Space	3000 sq. ft.	5	4	20
Option to Buy	No	1	3	3
Logistics	Medium	3	2	6
Real Estate Variables				
Cost of (25,000 -30,000) sq. ft. Manufacturing Site per sq.ft.	Medium	3	4	12
Expandability	Yes	3	3.5	10.5
Access	High	5	5	25
Lease Terms (NNN, IG, Full Service)	IG	3	3	9
Timing (available now or later)	Now	5	4	20
Laws and Regulatory Variables by County				
Governmental Incentives	No	1	2	2
Governmental Deterrents	No	5	5	25
Noise Ok Zoning	Yes	5	4	20
Dust Ok Zoning	Yes	5	4	20
Pro Growth County (Economic Zone?)	No	1	4	4
Warmboard Specific Variables				
Distance to Headquarters	Close	5	4	20
18' Ceiling Height	20	5	5	25
Loading Dock	1	3	2	6
Building Younger Than 20 Years Old	Yes	5	4	20
Minimum 600 Amp 440 Volt 3 Phase Electrical Supply	Yes	5	5	25
Preferred 1200 Amp 440 Volt 3 Phase Electrical Supply	No	1	4	4
	General Total	137	Warmboard Total	503.5

V. South San Francisco - 239 Utah Av.	Actual	Satisfaction Score (1-5)	Value Multiplier	Warmboard Value
Business and Operating Conditions				
Access				
Suppliers	High	5	5	25
Shipping	High	5	5	25
Workforce				
Availability	High	5	3	15
Capability	Medium	3	3	9
Scalability	High	5	2	10
Sustainability	High	5	4	20
Livability	High	5	4	20
Utility Infrastructure				
Power	High	2	5	10
Fuel	Medium	3	2	6
Water/Sewer	Medium	3	2	6
Telecom	Med-Low	4	2	8
Transportation Infrastructure				
Roads	High	5	5	25
Air	Med	3	2	6
Rail	Med	3	3	9
Port	Low	1	1	1
Geographically Variable Costs				
Workforce				
Wages/Salaries	High	2	3	6
Benefits	Medium	3	1	3
Real Estate				
Land/Sites of Proper Size (25,000-30,000 sq.ft.)	25,262 sq. ft.	5	5	25
Building is Mostly Warehouse With <3000 sq.ft. Office Space	5000 sq. ft.	4	4	16
Lease	Yes	5	4	20
Option to Buy	Yes	5	3	15
Logistics	Medium	4	2	8
Real Estate Variables				
Cost of (25,000 -30,000) sq. ft. Manufacturing Site per sq.ft.	'8/sq.ft./month	2	4	8
Expandability	Yes	5	3.5	17.5
Access	High	5	5	25
Lease Terms (NNN, IG, Full Service)	IG	4	3	12
Timing (available now or later)	Now	5	4	20
Laws and Regulatory Variables by County				
Governmental Incentives	Yes	5	2	10
Governmental Deterrents	No	5	5	25
Noise Ok Zoning	Yes	5	4	20
Dust Ok Zoning	Yes	5	4	20
Pro Growth County (Economic Zone?)	Yes	5	4	20
Warmboard Specific Variables				
Distance to Headquarters	1 hr. 20 min.	2	4	8
18' Ceiling Height	23'	5	5	25
Loading Dock	2	5	2	10
Building Younger Than 20 Years Old	Yes	5	4	20
Minimum 600 Amp 440 Volt 3 Phase Electrical Supply	900 A 320 V	5	5	25
Preferred 1200 Amp 440 Volt 3 Phase Electrical Supply	No	1	4	4
	General Total	154	Warmboard Total	557.5

VI. Gilroy - 8100 Camino Arroyo Rd.	Actual	Satsisfaction Score (1-5)	Value Multiplier	Warmboard Value
Business and Operating Conditions				
Access				
Suppliers	High	5	5	25
Shipping	High	5	5	25
Workforce				
Availability	High	5	3	15
Capability	Medium	3	3	9
Scalability	High	5	2	10
Sustainability	High	5	4	20
Livability	Low	1	4	4
Utility Infrastructure				
Power	Medium	3	5	15
Fuel	Medium	3	2	6
Water/Sewer	Medium	3	2	6
Telecom	Medium	3	2	6
Transportation Infrastructure				
Roads	High	5	5	25
Air	Med	3	2	6
Rail	Med	3	3	9
Port	Low	1	1	1
Geographically Variable Costs				
Workforce				
Wages/Salaries	Low	5	3	15
Benefits	Low	5	1	5
Real Estate				
Land/Sites of Proper Size (25,000-30,000 sq.ft.)	25,000 sq. ft.	5	5	25
Building is Mostly Warehouse With <3000 sq.ft. Office Space	0 sq. ft.	3	4	12
Lease	Yes	5	4	20
Option to Buy	Yes	5	3	15
Logistics	Simple	5	2	10
Real Estate Variables				
Cost of (25,000 -30,000) sq. ft. Manufacturing Site per sq.ft.	$.055 /sq.ft./month	4	4	16
Expandability	Low	1	3.5	3.5
Access	Med-High	4	5	20
Lease Terms (NNN, IG, Full Service)	NNN	1	3	3
Timing (available now or later)	Now	5	4	20
Laws and Regulatory Variables by County				
Governmental Incentives	No	1	2	2
Governmental Deterrents	No	5	5	25
Noise Ok Zoning	Yes	5	4	20
Dust Ok Zoning	Yes	5	4	20
Pro Growth County (Economic Zone?)	No	1	4	4
Warmboard Specific Variables				
Distance to Headquarters	46 Min	4	4	16
18' Celing Height	18'	5	5	25
Loading Dock	2	5	2	10
Building Younger Than 20 Years Old	1985	2	4	8
Minimum 600 Amp 440 Volt 3 Phase Electrical Supply	2000A 480V	5	5	25
Prefered 1200 Amp 440 Volt 3 Phase Electrical Supply	2000A 480V	5	4	20
	General Total	144	Warmboard Total	521.5

VII. San Jose - 2277 Ringwood Av.	Actual	Satisfaction Score (1-5)	Value Multiplier	Warmboard Value
Business and Operating Conditions				
Access				
Suppliers	High	5	5	25
Shipping	High	5	5	25
Workforce				
Availability	High	5	3	15
Capability	Medium	3	3	9
Scalability	High	5	2	10
Sustainability	High	5	4	20
Livability	Med	3	4	12
Utility Infrastructure				
Power	Medium	3	5	15
Fuel	Medium	3	2	6
Water/Sewer	Med-High	2	2	4
Telecom	Low	4	2	8
Transportation Infrastructure				
Roads	High	5	5	25
Air	Med	3	2	6
Rail	Med	3	3	9
Port	Low	1	1	1
Geographically Variable Costs				
Workforce				
Wages/Salaries	Medium	3	3	9
Benefits	Low	5	1	5
Real Estate				
Land/Sites of Proper Size (25,000-30,000 sq.ft.)	29,159 sq. ft.	5	5	25
Building is Mostly Warehouse With <3000 sq.ft. Office Space	0 sq. ft	3	4	12
Lease	Yes	5	4	20
Option to Buy	No	1	3	3
Logistics	Simple	5	2	10
Real Estate Variables				
Cost of (25,000 -30,000) sq. ft. Manufacturing Site per sq.ft.	$0.39/sq.ft./month	5	4	20
Expandability	Yes	3	3.5	10.5
Access	High	5	5	25
Lease Terms (NNN, IG, Full Service)	NNN	1	3	3
Timing (available now or later)	Now	5	4	20
Laws and Regulatory Variables by County				
Governmental Incentives	Yes	5	2	10
Governmental Deterrents	No	5	5	25
Noise Ok Zoning	Yes	5	4	20
Dust Ok Zoning	Yes	5	4	20
Pro Growth County (Economic Zone?)	Yes	5	4	20
Warmboard Specific Variables				
Distance to Headquarters	48 mins.	5	4	20
18' Ceiling Height	22	5	5	25
Loading Dock	4	5	2	10
Building Younger Than 20 Years Old	Yes	5	4	20
Minimum 600 Amp 440 Volt 3 Phase Electrical Supply	Yes	5	5	25
Preferred 1200 Amp 440 Volt 3 Phase Electrical Supply	No	1	4	4
	General Total	152	Warmboard Total	551.5